# Operating Instructions

(Translation of original)

# BRINKMANN Immersion Pumps

## TB16…100

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# Brinkmann Immersions pumps of the series TB16 ... 100

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## 1 Indication to the manual

This operating manual gives basic instructions which are to be observed during installation, operation and maintenance of the pump. It is therefore imperative that this manual be read by the responsible personnel and operator prior to assembly and commissioning. It is always to be kept available at the installation site.

### 1.1 Identification of safety instructions in the operating manual

Safety instructions given in this manual non-compliance with which would affect **safety** are identified by the following symbol

Safety sign according with ISO 3864 – B.3.1

or where **electrical safety** is involved, with:

Safety sign according with ISO 3864 – B.3.6

Where non-compliance with the safety instructions may cause a risk to the machine and it's function the word

**ATTENTION**

is inserted.

## 2 Description of product

### 2.1 General description of the pump

Pumps of this type are one-stage rotary pumps of simple construction where the impeller is fixed on the driving shaft extension. Pump and motor form a compact and space-saving unit. The pump mechanism is gasket-less.
Vertically mounted pumps are equipped with a mounting flange. The pump end immerses into the tank and the motor extends vertically above the tank.

### 2.2 Intended use

The immersion pumps of the series TB are suitable for handling contaminated coolants within the limiting application in accordance with table 1.

**Limit of Application (Table 1)**

| Type | TB16...100 |
|---|---|
| Mediums | Cooling emulsions, cooling- and cutting-oils |
| Kinetic viscosity of the medium | ...45 $mm^2/s$ |
| Temperature of medium | 0 ... 60 °C |
| Particle-size in the medium | 3 mm TB16…40<br>7 mm TB63…100 |
| Dry running | Dry running causes increased wear and should be avoided. During the test of the direction of rotation (< 30 s) permissible. |
| Switching-on frequency per hour | Motors less 3 kW max. 200 |
| Ambient temperature | 40 °C |
| Set-up altitude | 1000 m |

**ATTENTION**

The pumps are to be operated within their design limits. Applications outside of these limits are not approved. The manufacturer is not responsible for any damages resulting from use of the pumps in such applications.

## 2.3 Technical data

| Type | | Max. del. pressure bar / spec. weight 1 | Max. del. volume l/min | Height [1] **H** mm | Pipe connection[1] **G** | Depth of immersion[1] **h** mm | Weight kg | Power kW | Noise level[2] dBA / 50 Hz |
|---|---|---|---|---|---|---|---|---|---|
| TB16 | / 90 | 0.32 | 35 | 137 | G ½ | 90 | 4.1 | 0.07 | 45 |
| | / 120 | | | | | 115 | 4.3 | | |
| | / 170 | | | | | 165 | 4.6 | | |
| | / 220 | | | | | 215 | 4.9 | | |
| TB25 | / 90 | 0.45 | 52 | 137 | G ½ | 90 | 4.2 | 0.10 | 45 |
| | / 120 | | | | | 115 | 4.4 | | |
| | / 170 | | | | | 165 | 4.6 | | |
| | / 220 | | | | | 215 | 5.0 | | |
| | / 270 | | | | G ¾ | 265 | 5.5 | | |
| | / 350 | | | | | 345 | 6.1 | | |
| TB40 | / 90 | 0.52 | 68 | 137 | G ¾ | 95 | 4.3 | 0.12 | 45 |
| | / 120 | | | | | 120 | 4.5 | | |
| | / 170 | | | | | 170 | 4.7 | | |
| | / 220 | | | | | 220 | 5.1 | | |
| | / 270 | | | | | 270 | 5.6 | | |
| | / 350 | | | | | 350 | 6.2 | | |
| TB63 | / 90 | 0.65 | 95 | 155 | G ¾ | 105 | 4.8 | 0.21 | 45 |
| | / 120 | | | | | 130 | 5.1 | | |
| | / 170 | | | | | 180 | 5.5 | | |
| | / 220 | | | | | 230 | 5.8 | | |
| | / 270 | | | | | 280 | 6.1 | | |
| | / 350 | | | | | 360 | 6.9 | | |
| TB100 | / 120 | 0.71 | 108 | 155 | G ¾ | 130 | 5.2 | 0.24 | 45 |
| | / 170 | | | | | 180 | 5.6 | | |
| | / 220 | | | | | 230 | 5.9 | | |
| | / 270 | | | | | 280 | 6.2 | | |
| | / 350 | | | | | 360 | 7.0 | | |

1) Dimensions in accordance with page 5

2) Noise emissions measured in accordance with DIN 45635 at a distance of 1 m

The motor is surface-cooled and compliant with DIN IEC 34 and EN 60034 (protection degree IP 55).

## 3 Safety instructions

When operating the pump, the safety instructions contained in this manual, the relevant national accident prevention regulations and any other service and safety instructions issued by the plant operator are to be observed.

### 3.1 Hazards in the event of non-compliance with the safety instructions

Non-compliance with the safety instructions may produce a risk to the personnel as well as to the environment and the machine and results in a loss of any right to claim damages.
For example, non-compliance may involve the following hazards:

- Failure of important functions of the machines/plant
- Failure of specified procedures of maintenance and repair
- Exposure of people to electrical, mechanical and chemical hazards
- Endangering the environment due to hazardous substances being released

### 3.2 Unauthorized modes of operation

- Pump may not be used in potentially explosive environments**!**
- Pump and discharge piping are not designed to hold any weight and may not be used as a step ladder.

### 3.3 Remaining Risk

**Risk of Injury!**
Risk of squeezing or crushing body parts when installing or removing the pump exists. Proper and secured lifting tools must be used.

**Risk of burns!**
The pump must have cooled down sufficiently prior to commencing any repair, maintenance or installation.

### 3.4 Qualification and training of operating personnel

The personnel responsible for operation, maintenance, inspection and assembly must be adequately qualified. Scope of responsibility and supervision of the personnel must be exactly defined by the plant operator. If the staff does not have the necessary knowledge, they must be trained and instructed, which may be performed by the machine manufacturer or supplier on behalf of the plant operator. Moreover, the plant operator is to make sure that the contents of the operating manual are fully understood by the personnel.

### 3.5 Safety instructions relevant for operation

- If hot or cold machine components involve hazards, they must be guarded against accidental contact.
- Guards for moving parts (e.g. coupling) must not be removed from the machine while in operation.
- Any leakage of hazardous (e.g. explosive, toxic, hot) fluids (e.g. from the shaft seal) must be drained away so as to prevent any risk to persons or the environment. Statutory regulations are to be complied with.
- Hazards resulting from electricity are to be prevented (see for example, the VDE Specifications and the bye-laws of the local power supply utilities).
- The pumps' stability against falling over is not ensured unless it is properly mounted onto the tank.

### 3.6 Safety instructions relevant for maintenance, inspection and assembly work

Any work on the machine shall only be performed when it is at a standstill, it being imperative that the procedure for shutting down the machine described in this manual be followed.
Pumps and pump units which convey hazardous media must be decontaminated.
On completion of work all safety and protective facilities must be re-installed and made operative again.
Prior to restarting the machine, the instructions listed under "Start up" are to be observed.

### 3.7 Signs on the pump

It is imperative that signs affixed to the machine, e.g.:

- arrow indicating the direction of rotation
- symbols indicating fluid connections

be observed and kept legible.

### 3.8 Unauthorized alterations and production of spare parts

Any modification may be made to the machine only after consultation with the manufacturer. Using spare parts and accessories authorized by the manufacturer is in the interest of safety. Use of other parts may exempt the manufacturer from any liability.

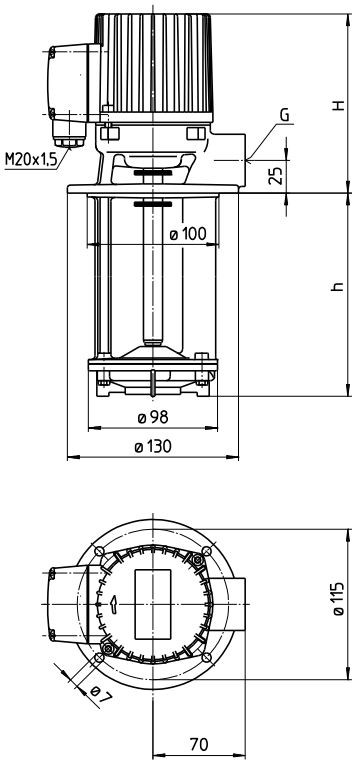
## 4 Transport and storage

Protect the pump against damage when transporting.
Pumps must be drained prior to their storage.
Store pump in dry and protected areas and protect it against penetration of foreign bodies.
Always store pump above the freezing point!

## 5 Installation and Connection

### 5.1 Mechanical installation

During any assembly or disassembly process the pumps must be secured against tipping trough ropes for example at all times.
Pumps must be mounted securely. Piping, tank and pumps must be mounted without any tension.
The inlet is at the bottom of the immersed pump body. The distance between the inlet and the tank bottom must be so large that the inlet can not be blocked by deposits during longer shutdowns.
To obtain the full flow rate it is recommended to choose for the pipework the nominal bore diameter of the pumps cross section for connection. Therefore pipe bends should be used, not pipe angles!
The pipework must be qualified for occuring hydraulic pressure.







**ATTENTION**

**Maximum tightening torque for piping connections is 70 Nm for G ½ and 80 Nm for G ¾ !**

**When installed the space around the pump must be large enough to provide sufficient cooling of the motor.**

**Do not prop up the pressure line via the joining socket.**

**The pump must be mounted in that way that rotating parts under the cover of the coolant tank can not be touched!**

### 5.2 Electric wiring

**All service work must be carried out by qualified service personnel. Pump must be disconnected from the power source and all rotating parts must stand still. Reassure that pump is disconnected from power source and cannot be switched on. Verify that there is no voltage at the terminal board!**

According to the European Standard EN809 a motor overload must be installed and properly set to the full load amps stated on the pump name plate.

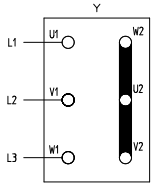
It is the responsibility of the machine operator to decide whether or not an additional emergency switch must be installed.

#### 5.2.1 Circuit

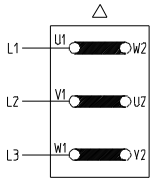
Tension voltage and frequency must correspond with the shown specification on the nameplate.
The pump must be wired so that a solid long term electrical connection is ensured. Establish a solid ground connection.

**The electrical wiring must be performed according to the wiring diagram shown inside the terminal box cover. (Please see above sample wiring diagrams)**

**Wiring diagram e.g.**




**Star connection**
3 x 400 V, 50 Hz
resp. 380-420 V, 50 Hz




**Delta connection**
3 x 230 V, 50 Hz
resp. 220-240 V, 50 Hz

There may be no foreign objects such as dirt, particles or humidity inside the terminal board.

Mount terminal board cover to motor tight against dust and humidity and close up all unused wiring ports.

**ATTENTION**

When Variable Frequency Drives are used interfering signals might occur.
Non-sinus shaped supply voltage from a variable frequency drive might result in elevated motor temperatures.

## 6 Start up / Shut down

### 6.1 Start up

**ATTENTION**

Switch off at the mains.
After connection the electrical wires, close the terminal box. Briefly start the motor (max. 30 sec.) and check the rotation according to the arrow on the top of the motor.
If the direction is incorrect change over two of the power leads.

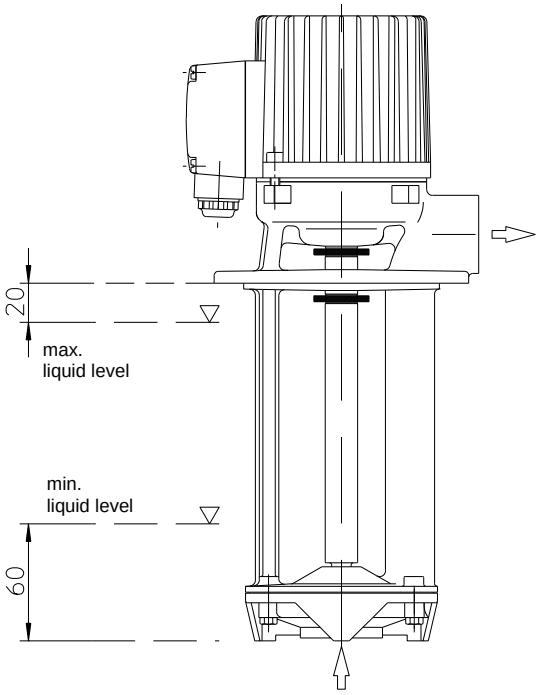
### 6.2 Shut down

All service work must be carried out by qualified service personnel. Pump must be disconnected from the power source and all rotating parts must stand still. Reassure that pump is disconnected from power source and cannot be switched on. Verify that there is no voltage at the terminal board! Open terminal box and disconnect the power leads. Empty out the pump.

## 7 Operation

**Liquid level**

According to the drawing shown below, the maximum liquid level must stay about 20 mm below the mounting flange, also ensure that the minimal liquid level is 60 mm before starting up the motor.




**If the pump should lock up and cease, shut pump down (see 6.2) and disconnect from power supply. Pump must be uninstalled and removed from the system prior to its repair.**

## 8 Servicing and Maintenance

**ATTENTION**

The surface of the motor must be kept free of dirt.

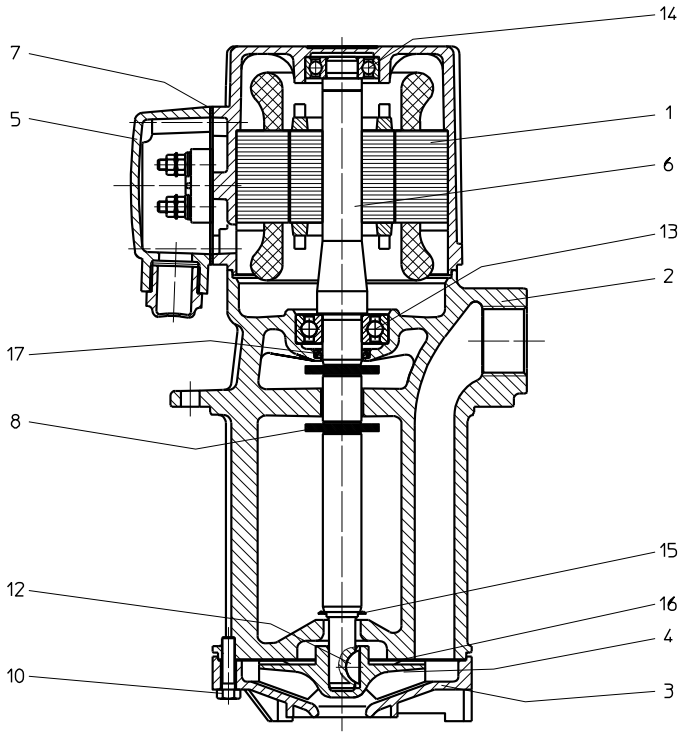
The motor shaft is spinning in permanently greased ball bearings (with special grease and increased bearing play) and does not require any special maintenance.

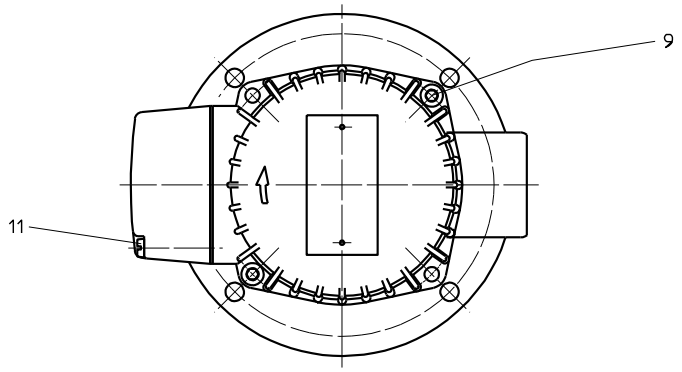
## 9 Trouble shooter's guide

| Fault | Cause | Remedy |
|---|---|---|
| Motor does not start, no motor noise | At least two of the power supply leads have failed<br><br>Overload has tripped | Check fuses, terminals and supply leads .<br><br>Inspect overload |
| Motor does not start, humming noise | One of the supply leads has failed<br><br>Impeller faulty<br>Motor bearing faulty | See above<br><br>Replace impeller<br>Replace bearing |
| Overload trips | Pump locked up mechanically<br>High on/of cycling frequency | Inspect pump hydraulics<br>Check application |
| Power consumption is too high | Wrong direction of rotation of impeller<br>Lime or other deposits mechanical friction | See above<br><br>Clean pump mechanism<br>repair pump |
| Motor overheats | High on/off cycling frequency<br>Wrong power supply (voltage or cycles)<br><br>Insufficient cooling | See above<br>Power supply must correspond with name plate rating<br><br>Check air flow at motor fan |
| Pump does not pump | liquid level too low<br>Pump mechanism faulty<br>Pipe blocked | Fill up liquid<br>replace pump mechanism<br>Clean pipe |
| Insufficient flow and pressure | Wrong direction of rotation of impeller<br><br>Pump mechanism silted up<br>Worn pump mechanism | Change over two power supply leads<br><br>Clean pump mechanism<br>Replace pump mechanism |
| Incorrect flow or pressure | Wrong power supply (voltage or cycles) | Power supply must correspond with name plate rating |
| Running noise/Vibration | Foreign objects in pump end<br>Impeller damaged<br>Bearing/Bushing broken | Remove foreign objects<br>Replace impeller<br>Replace bearing/bushing |

## 10 Spare part

### 10.1 Spare part list for the immersion pumps of the series TB16 ... 100




| Item | Description | |
|---|---|---|
| 1 | Stator with terminal board | |
| 2 | Pump body | |
| 3 | Inlet cover | |
| 4 | Impeller | |
| 5 | Terminal box | |
| 6 | Shaft with rotor | |
| 7 | Gasket | |
| 8 | Splash ring | |
| 9 | Socket head cap screw | DIN 912 |
| 10 | Hexagon head screw | DIN 933 |
| 11 | Slotted cheese head screw | DIN 84 |
| 12 | Woodruff key | DIN 6888 |
| 13 | Ball bearing | DIN 625 |
| 14 | Ball bearing | DIN 625 |
| 15 | Retaining ring<br>depth of immersions up to 230 mm | |
| 16 | Gasket<br>for TB40, TB63 and TB100 | |
| 17 | Rotary shaft seal | |

### 10.2 Indications to the spare part order

Spare parts are available from the supplier.
Standard commercially available parts are to be purchased in accordance with the model type.
The ordering of spare parts should contain the following details:

1. **Pumptype**
   e.g. TB16 / 90
2. **Pump No.**
   e.g. 04151100
   The date of the construction year is a component of the pumps type number.
3. **Voltage, Frequency and Power**
   Take item 1, 2 and 3 from the nameplate
4. **Spare part with item No.**
   e.g. Impeller item No. 4

**Tightening torques for screwed connections**

| Thread - ∅ | **M4** | **M5** |
|---|---|---|
| Strength classes | 4.8 | 8.8 |
| Tightening torque (Nm) | **1** Nm | **2** Nm Item 10<br>**3** Nm Item 9 |

## 11 Disposal

When disposing of the pump or the packaging materials the local and national regulation for proper disposal must be complied with.
Prior to its disposal, the pump must be completely drained and decontaminated if necessary.

## 12 EC declaration of conformity

DEUTSCH / ENGLISH /FRANÇAIS / ESPAÑOL

BRINKMANN PUMPS

### EG-Konformitätserklärung

**EC declaration of conformity / Déclaration de conformité CE / Declaración de conformidad CE**

Hersteller / Manufacturer / Constructeur / Fabricante

**Brinkmann Pumpen, K. H. Brinkmann GmbH & Co. KG**
**Friedrichstraße 2, D-58791 Werdohl**

Produktbezeichnung / Product name / Désignation du produit / Designación del producto

**Tauchpumpen / Immersion pumps / Pompes plongeantes / Bombas de inmersión**

**Typ / Type / Tipo** **TB16…100**

Das bezeichnete Produkt stimmt mit den folgenden Richtlinien des Rates zur Angleichung der Rechtsvorschriften der EG-Mitgliedsstaaten überein:
The named product conforms to the following Council Directives on approximation of laws of the EEC Member States:
Le produit sus-mentionné est conforme aux Directives du Conseil concernant le rapprochement des législations des Etats membres CEE:
El producto designado cumple con las Directivas del Consejo relativas a la aproximación de las legislaciones de los Estados Miembros de la CEE:

| | |
|---|---|
| **2006/42/EG** | Richtlinie für Maschinen |
| **2006/42/EC** | Council Directive for machinery |
| **2006/42/CEE** | Directive du Conseil pour les machines |
| **2006/42/CEE** | Directivas del Consejo para máquinas |
| **2004/108/EG** | Richtlinie für elektromagnetische Verträglichkeit |
| **2004/108/EC** | Council Directive for Electromagnetic compatibility |
| **2004/108/CEE** | Directive du Conseil pour Compatibilité électromagnétique |
| **2004/108/CEE** | Directivas del Consejo para Compatibilidad electromagnética |

Hinsichtlich der elektrischen Gefahren wurden gemäß Anhang I Nr. 1.5.1 der Maschinenrichtlinie 2006/42/EG die Schutzziele der Niederspannungsrichtlinie 2006/95/EG eingehalten.
With respect to potential electrical hazards as stated in appendix I No. 1.5.1 of the machine guide lines 2006/42/EG all safety protection goals are met according to the low voltage guide lines 2006/95/EG.
Conformément à l'annexe I N° 1.5.1 de la Directive "Machines" (2006/42/CE) les objectifs de sécurité relatifs au matériel électrique de la Directive "Basse Tension" ont été respectés.
Con respecto al potencial peligro eléctrico como se indica en el apéndice I No. 1.5.1 del manual de la máquina 2006/42/EG, todos los medios de protección de seguridad se encuentran según la guía de bajo voltaje 2006/95/EG.

Die Übereinstimmung mit den Vorschriften dieser Richtlinien wird nachgewiesen durch die vollständige Einhaltung folgender Normen:
Conformity with the requirements of this Directives is testified by complete adherence to the following standards:
La conformité aux prescriptions de ces Directives est démontrée par la conformité intégrale avec les normes suivantes:
La conformidad con las prescripciones de estas directivas queda justificada por haber cumplido totalmente las siguientes normas:

Harmonisierte Europ. Normen / Harmonised Europ. Standards / Normes europ. harmonisées / Normas europ. armonizadas

**EN 809 :1998+A1 :2009+AC :2010 EN ISO 12100 :2010 EN 60204-1 :2006/AC :2010 EN 61000-3-2 :2006/A2 :2009 EN 61000-3-3 :2013 EN 61000-6-2 :2005/AC :2005 EN 61000-6-3 :2007/A1 :2011/AC :2012**

Nationale Normen / National Standards / Normes nationales / Normas nacionales : **EN 60034-1 :2010/AC :2010**

**Die Hinweise in der Betriebsanleitung für den Einbau und die Inbetriebnahme der Pumpe sind zu beachten.**

**The instructions contained in the operating manual for installation and start up the pump have to be followed.**

**Les indications d'installation / montage et de mise en service de la pompe prévues dans l'instruction d'emploi doivent être suivies.**

**Tenga en cuenta las instrucciones en el manual para la instalación y puesta en marcha de la bomba.**

**Brinkmann Pumpen, K. H. Brinkmann GmbH & Co. KG**

Werdohl, 16.04.2015

.....
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